TECHNICAL WORK MAY NOT BEGIN PRIOR TO CO APPROVAL

NASA/GODDARD SPACE FLIGHT CENTER

REQUEST FOR TASK PLAN / TASK ORDER

CONTRACTOR	CONTRACT NO./TASK NO.	JOB ORDER NUMBER	APPROP. FY
QSS Group, Inc.	NAS5- 99124 TASK NO. 94 AMENDMENT	563-839-30-63-89	99

TASK TITLE: (NTE 80 characters; include Project name)

NanoSat EPS Structural Battery Design and Delivery

APPROVALS: (Type or print name and sign)

	DATE	ORG CODE	MAIL CODE	PHONE
ASSISTANT TECHNICAL REPRESENTATIVE (OR TASK MONITOR) Bob G. Beaman for Thomas Yi	5/20/99	563	563	301-286-2538
BRANCH HEAD Marlon Enciso for Thomas Yi	DATE	CODE 563		PHONE 301-286-5845
CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (COTR) Robert Lebair	5/24/99	CODE 560		PHONE 301-286-6382

FLIGHT HARDWARE, CRITICAL GSE OR SOFTWARE? (IF YES, NEED CODE 303 CONCURRENCE NEXT BLOCK)	CONTRACTING OFFICER'S QUALITY REP.	DESIGNATED FAM:
[X] NO [ ] YES	Larry Moore	

The contractor shall identify and explain the reason for any deviations, exceptions, or conditional assumptions taken with respect to this Task Order or to any of the technical requirements of the Task Order Statement of Work and related specifications. The contractor shall complete and submit the required Reps and Certs.

(To be completed by Contracting Officer)
C.O. Requested Quote on:
Date: MAY 25 1999

Contractor will develop specification or statement of work under this task for a future procurement. [X] NO [ ] YES

Flight hardware will be shipped to GSFC for testing prior to final delivery. [ ] NO [ ] YES [X] N/A

Government Furnished Property/Facilities: [X] NO [ ] YES -- SEE LIST OF GFP (offsite only) / FACILITIES (onsite only)

Onsite Performance: [X] NO [ ] YES If yes: [ ] TOTAL [ ] PARTIAL
If partial, indicate onsite work in SOW by asterisk (*)

Surveillance Plan Attached: [X] NO [ ] YES

Highlighted Contract Clauses: *(to be completed by Contracting Officer)*

INCENTIVE FEE STRUCTURE (check one)

(See Contract NAS5-99124, Attachment K, Incentive Fee Plan)

	___ No. 1	_X_ No. 2	___ No. 3	___ No. 4	___ No. 5
Cost	10%	50%	25%	25%	%
Schedule	15%	25%	25%	50%	%
Technical	75%	25%	50%	25%	%

(To be completed by Contracting Officer)

The target cost of this task order is $_ _____.

The target fee of this task order is $_____.

The total target cost and target fee of this task order as contemplated by the Incentive Fee clause of this contract is $_____.

The maximum fee is $_____.

The minimum fee is $0.

AUTHORIZED SIGNATURE:

THIS TASK ASSIGNMENT IS ISSUED ACCORDING TO THE CONTRACT CLAUSE "TASK ASSIGNMENTS AND REPORTS"

SIGNATURE OF CONTRACTING OFFICER | DATE | TYPED NAME OF CONTRACTING OFFICER

CONTRACTOR'S ACCEPTANCE:

AUTHORIZED SIGNATURE | DATE

GSFC FORM 703-1845 12/98 (OLDER VERSIONS ARE OBSOLETE)

DISTRIBUTION: CONTRACTOR, CONTRACTING OFFICER, COTR, CODE 303, RESOURCES ANALYST, ASSISTANT TECHNICAL REPRESENTATIVE

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REQUEST FOR TASK PLAN / TASK ORDER

CONTRACTOR	CONTRACT NO./TASK NO.		
	NAS5-	TASK NO.	AMENDMENT
QSS Group, Inc.	99124	94	

Applicable paragraphs from contract Statement of Work:

STATEMENT OF WORK: (Continue on blank paper if additional space is required)

See Attached SOW.

PERFORMANCE SPECIFICATIONS:

See attached performance specification.

APPLICABLE DOCUMENTS:

NanoSat Specifiification Document.

TASK END DATE: Sept 30 1999

MILESTONES/DELIVERABLES AND DATES:

1. Fourteen (14) panels shall be delivered by 9/30/99.
   a. Two (2) panels 15 cm x 15 cm maximum dimensions shall be active structural batteries
   b. Twelve (12) panels shall be structural equivalent panels adapted for structural test purposes. See Mechanical Requirements Section of SOW for further information. Core material, face sheets and other materials shall be identical to the active structural batteries.
2. Milestone chart to ATR by 7/1/99
3. Monthly Technical Progress Reports to ATR.
4. Bi-Weekly Reports to ATR. (written correspondence, e-mail, or phone call)
5. Interfaces Definition Report to ATR by 7/1/99.
6. Initial Design Report to ATR by 7/1/99.
7. Requirements Analyses to ATR by 8/15/99.

PERFORMANCE STANDARDS:

Schedule: On-time delivery of the above.
Technical: ATR's acceptance of the above.

FINAL DELIVERY DESTINATION (NAME, BLDG, ROOM):
Bob G. Beaman, NASA/GSFC Bld 20 Rm 170

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NASA/GODDARD SPACE FLIGHT CENTER

REQUEST FOR TASK PLAN / TASK ORDER

Contract NAS5-99124
Task #: **94**
STATEMENT OF WORK:

The contractor shall develop and provide a structural battery for NanoSat spacecraft application. The Structural Battery will be implemented on a nanosatellite as a structural side panel populated by solar cells. A heat transfer path to a top or bottom deck is possible. However, the contractor must define interfaces required and the initial design. The NanoSat will be in a 7.5-degree inclination, High Earth Orbit (HEO) with perigee at 3 Earth Radii (ER) from the Earth's center and apogee at 12 to 60 ER. Mission duration is 2 years. Area of the top and/or bottom panel is limited to 150 cm^2.

The requirements are stated below in the Performance Specification section. The contractor may team with Government, a battery manufacturer, composite house or technology developer. Response shall specify company, dept and personnel if teaming is proposed.

One potential source that should be considered is Boundless Corp. who has developed many configurations and some demonstration/prototype units for a structural battery concept. Boundless has developed several concepts for GSFC in a Phase I SBIR,l and has continued work in the structural battery area to develop some unique concepts that no other known company or agency is developing. They are located at:

Boundless Corporation
P.O. Box 20510
Boulder Colorado 80308-3510

Phone 303-664-9962
Fax 303-664-9960

POC Mr Philip Lyman or Mr. Timothy Feaver

PERFORMANCE SPECIFICATION:

The structural battery for NanoSat spacecraft shall meet these requirements:

General Requirements:
Panel dimensions: 15cm x 15cm, including border for structural attachment, thermally conductive flange, ports, etc. Thickness may not exceed 2cm.
All panels shall be available for inspection before testing.

Electrical Requirements:
Each panel shall provide 1.25 ah of battery capacity.
Performance: 100 wh/Kg to be demonstrated or backed up with analytical data.

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NASA/GODDARD SPACE FLIGHT CENTER

REQUEST FOR TASK PLAN / TASK ORDER

Contract NAS5-99124
Task #: **94**

Thermal: Preliminary thermal analysis predicts adequate margin for heat dissipation. The deployed NanoSat will spin at ~20RPM with side panels perpendicular to the sun 28°, thus top and bottom decks will radiate primarily into cold space.

Construction: The Structural Battery shall be of sandwich construction, with the battery cell comprising the core, and standard face-sheet material of Aluminum or composite. Core material will be a two-dimensional isotropic in plane construction.

Loading: The satellite will be deployed from a mother ship. During launch, it will undergo static and dynamic loads from the Delta II launch vehicle and release mechanism.

Radiation: The total dose is expected to be 100krad per year.

Mechanical Requirements:
Structural strength to be equivalent to a structural sandwich panel of similar dimensions and mass. (For example, 2-ply Face sheets, 90 deg-lay, t-50 graphite fibers, 5 mil per ply; 3.1 lb/cu ft Al core). Core material will be a two-dimensional isotopic in plane construction.
Analysis or test shall demonstrate structural equivalence.
Applicable test Standards: ASTM C297 Flat-Wise Tension; C393, Flexural Properties (12" x 2" x 1" optimal size). See www.astm.org for more information.
Active Samples shall have provision for temperature measurement.
The inert samples shall be made to allow equivalent charge/discharge pressure cycles (e.g. sealed panel with pressure port and 1mm-diameter holes through core to allow uniform cell pressure).
Flexural test samples shall be the proper dimensions to ensure adequate test.
Accommodation shall be made along edges for attachment to nanosatellite.

Thermal Requirements:
Preliminary analysis indicates the panel implementation on a spinning satellite can dissipate 1.25 ah through the solar cells. Cross-panel thermal gradients of electrochemically active components shall be within 5 degrees Celsius at all times.